REMARKS

Applicant recognizes with appreciation that the Examiner indicated that Claims 3 and 10 would be allowable if rewritten in independent form including all the limitations of the case claim and any intervening claims.

In this Amendment, Applicant has cancelled Claims 3, 10, 13, 15 and 17 – 20, without prejudice and disclaimer, amended Claims 1 and 8, and added new Claims 21 – 28. Claims 1 and 8 have been amended to incorporate the features of Claims 3 and 10, respectively, which are allowable according to the Examiner. Claims 21 – 28 have been added to specify other embodiments of the present invention. It is respectfully submitted that no new matter has been introduced by the amended claims. All claims are now present for examination and favorable reconsideration is respectfully requested in view of the preceding amendments and the following comments.

CLAIM OBJECTION

Claim 1 has been objected as containing certain informality.

It is respectively submitted that Claim 1 has been amended to delete "decode" and insert "decoded" to correct a clerical error. Therefore the objection has been overcome. Accordingly, withdrawal of the objection is respectfully requested.

REJECTIONS UNDER 35 U.S.C. § 102:

Claims 1, 8 and 17 – 20 have been rejected under 35 U.S.C. § 102 (b) as allegedly being anticipated by Augenbraun et al. (US 5,654,759), hereinafter Augenbraun.

Applicant traverses the rejection and respectfully submits that the presently claimed invention is not anticipated by the cited reference. It is respectfully submitted that Claims 1 and 8 have been amended to incorporate features of Claims 3 and 10,

respectively, which are allowable according to the Examiner. In addition, Claims 17 – 20 have been cancelled without prejudice or disclaimer. Therefore, the rejections to Claims 1, 8 and 17 – 20 are moot.

Regarding the newly added claims, as defined in new claim 21, a block-noise detection apparatus according to the embodiment of the present invention includes a differentiator, a first detector, and a first processor. When receiving an input video signal, the differentiator applies differentiation processing to the video signal for every pixel and outputs a differentiated signal. The differentiated signal is supplied to the first detector. The detector detects solitary differentiated points on the differentiated signal and outputs a first detection signal. The first detection signal is supplied to the first processor. The processor has a feed-back system in which an output signal of the processor is delayed by a period corresponding to the number of pixels in the horizontal direction in each pixel block and added to the input first detection signal, thus outputting a first addition signal. Block noises generated on the input video signal are detected based on the first addition signal.

More specifically, the differentiator as claimed corresponds to differentiation 1 in FIG. 2. When receiving an input video signal, such as the one shown in FIG. 3A, the differentiator applies differentiation processing to the video signal for every pixel and outputs a differentiated signal as shown in FIG. 3B. The differentiator outputs a differentiated signal for all pixels of the input video signal. It applies differentiation processing to the video signal for every pixel, so that it does not care where the pixel-block boundaries are. The differentiated signal is supplied to the first detector.

The first detector corresponds to solitary differentiated point detection 2 in FIG. 2 and value converter 3a in FIG. 4. When receiving the differentiated signal, the detector detects solitary differentiated points, such as those shown in FIG. 3C, on the differentiated signal and outputs a first detection signal indicating timing of the solitary differentiated points. In other words, among differentiated signal components, such as those shown in FIG. 3B, impulse-like differentiated signal components are only detected

as solitary differentiated points, other components being neglected. The timing of the solitary differentiated points is output as the first detection signal. The detector detects impulse-like differentiated signal components as solitary differentiated points. It also does not care where the pixel-block boundaries are. The first detection signal output based on detection of the solitary differentiated points is supplied to the first processor.

The first processor corresponds to the adder 3b and the delay circuits 3c in FIG. 4. The processor has a feed-back system, as shown in FIG. 4, in which an output signal of the processor is delayed by a period corresponding to the number of pixels in the horizontal direction in each pixel block and added to the input first detection signal.

The number of pixels in the horizontal direction in each pixel block equals to the number of pixels in the horizontal direction in each pixel block of a video signal that has been coded and decoded for each pixel block before input to the block-noise detection apparatus. Detection of pixel-block boundaries is not required for the input video signal because all pixels of the video signal are successively subjected to the processing as explained above. Therefore, the block-noise detection apparatus performs processing as described above with no relationship to pixel-block boundaries.

The first processor delays its output signal and adds the delayed signal to the input first detection signal with no relationship to pixel-block boundaries. The output of the first processor is increased only when the solitary differentiated points are detected at certain intervals. Each interval corresponds to the number of pixels in the horizontal direction in each pixel block, as discussed above.

Many solitary differentiated points could be generated in a frame of image due to, for example, edges carried by a video signal. Among such many solitary differentiated points, those generated at intervals of the number of pixels (such as, 8, 16 or 32 pixels) in the horizontal direction in each pixel block are detected by the first processor and sent to the first processor as the first detection signal. The output of the first processor is increased only when solitary differentiated points are generated with intervals of the

number of pixels in the horizontal direction in each pixel block. It is not increased when solitary differentiated points are generated randomly or at intervals different from the intervals of the number of pixels in the horizontal direction in each pixel block.

As explained above in detail, the features of the embodiments of the present invention lie in the detection of solitary differentiated points from an input video signal and determination as to whether or not block noises are generated in the video signal depending on whether or not those points are generated at intervals of the number of pixels in the horizontal direction in each pixel block.

In contrast, Augenbraun performs the following different process in detection of block noises in the pixel block A in FIG. 3. More specifically, according to Augenbrau, a level difference is calculated between neighboring pixels along the boundary between the pixel blocks A and B. Such level differences are added for all pixels along the boundary to give edge information on the boundary between the pixel blocks A and B. The same process is applied to the pixel blocks A and C to give edge information on the boundary between these blocks. Block noises are then detected in the pixel block A based on the total of the edge information on the boundaries between the blocks A and B, and A and C. As explained above, Augenbraun detects block noises in the pixel block A based on the cost function that is the total of the edge information on the boundaries between the blocks A and B, and A and C.

Therefore, Augenbraun does not disclose the differentiator, the first detector and the first processor defined in new Claim 21.

Moreover, the following claim elements in new claims 22 to 24 are not disclosed or taught by Augenbraun: the second detector corresponding to the comparator 3e (FIG. 4), and the second processor corresponding to the adder 3f and the delay 3g (FIG. 4) in Claim 22; the third detector corresponding to the comparator 3i (FIG. 4), and the counter corresponding to the counter 4a (FIG. 4) in Claim 23; and a plural number of delay units corresponding to the delays 4c and 4d (FIG. 6) in Claim 24. Similarly, Augenbrau fails

to disclose the features of the method Claims 25 to 28, which correspond to the apparatus claims 21 to 24, respectively.

Therefore, the newly presented claims are not anticipated by Augenbraun and the rejection under 35 U.S.C. § 102 (e) has been overcome. Accordingly, withdrawal of the rejections under 35 U.S.C. § 102 (e) is respectfully requested.

REJECTIONS UNDER 35 U.S.C. § 103:

Claims 13 and 15 have been rejected under 35 U.S.C. § 103, as allegedly being obvious and unpatentable over Augenbraun et al. (US 5,654,759), hereinafter Augenbraun.

Applicant traverses the rejection. It is respectfully submitted that in view of the presently claimed invention, the rejection has been overcome. More specifically, Claims 13 and 15 have been cancelled without prejudice or disclaimer. Therefore, the rejection to Claims 13 and 15 is moot.

Regarding the newly added Claims 21 – 28, the significant differences between the embodiments of the present invention as claimed in Claims 21 – 28 and the disclosure in Augenbraun are described as above. Augenbraun does not teach or disclose the embodiments of the present invention as presently claimed. Nowhere in Augenbraun or other prior art has suggestion or incentive to modify Augenbraun to achieve the present invention. One of ordinary skilled in the art would not discern the present invention at the time of its invention.

Therefore, nowhere in prior art has suggestion or incentive to modify Augenbraun to achieve the present invention. Accordingly, withdrawal of the rejection under 35 U.S.C. § 103 is respectfully requested.

Having overcome all outstanding grounds of rejection, the application is now in condition for allowance, and prompt action toward that end is respectfully solicited.

Respectfully submitted,

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